CLAIMS

What is claimed is:

1. A positive imageable, particulate-filled photoresist composition comprising (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates.

2. The composition of Claim 1 wherein the particulates are selected from the group consisting of glass, oxides, carbides, nitrides, metals, metal alloys, metalloids, metalloid alloys, metal/metalloid alloys, carbon and mixtures thereof.

3. The composition of Claim 2 wherein the oxides are selected from the group consisting of aluminum oxides, silicon oxides, tin oxides and mixtures thereof.

4. The composition of Claim 1 wherein the particulates are selected from the group consisting of transition metals and their alloys.

5. The composition of Claim 4 wherein the transition metals are selected from the group consisting of Al, Cu, Ag, Au, Pt, and Pd.

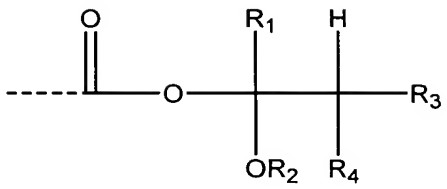
6. The composition of Claim 1 wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, bismuth, and their alloys.

7. The composition of Claim 1 wherein the particulates are selected from the group consisting of metal/metalloid alloys.

8. The composition of Claim 2 wherein the carbon is in the form of carbon nanotubes.

9. The composition of Claim 1 wherein the photopolymer system is selected from the group consisting of novolac-diazonaphthoquinone resins.

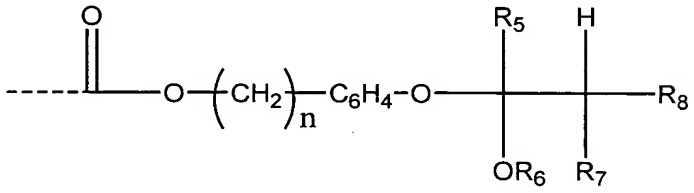
10. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula I:



Formula I

wherein R_1 is hydrogen or C_1-C_6 alkyl; R_2 is C_1-C_6 alkyl; and R_3 and R_4 independently are hydrogen or C_1-C_6 alkyl; and wherein R_1 and R_2, or R_1 and R_3, or R_2 and R_3 may be joined to form a 5-, 6-, or 7-membered ring.

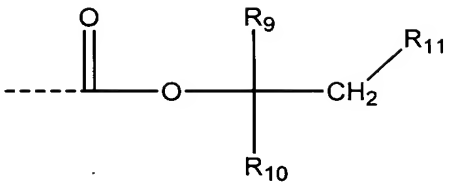
11. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula II:



Formula II

wherein n is 0-4; R_5 is hydrogen or C_1-C_6 alkyl; R_6 is C_1-C_6 alkyl; and R_7 and R_8 independently are hydrogen or C_1-C_6 alkyl; and wherein R_5 and R_6, or R_5 and R_7, or R_6 and R_7 may be joined to form a 5-, 6-, or 7-membered ring.

12. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula III:



Formula III

wherein R_9 is hydrogen or lower alkyl; R_{10} is lower alkyl; and R_{11} is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

13. The composition of Claim 1, wherein the photopolymer system comprises acid labile monomeric components selected from:

tetrahydropyranyl methacrylate (or acrylate);

tetrahydropyranyl p-vinylbenzoate;

1-ethoxy-1-propyl p-vinylbenzoate;

4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);

4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);

t-butyl methacrylate (or acrylate);

neopentyl methacrylate (or acrylate);

1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives;

1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives;

1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives;

1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; and

1-adamantyl methacrylate (or acrylate) and their derivatives.

14. The composition of Claim 1 further comprising additives selected from the group consisting of solvents and viscosity aids.

15. The composition of Claim 1 wherein the particulates comprise about 20 to about 70 vol% of the composition.

16. The composition of Claim 1 wherein the particulates are less than 100 microns in their longest dimension.

17. The composition of Claim 1 wherein the particulates are less than 10 microns in their longest dimension.

18. The composition of Claim 1 in the form of a printable paste.

19. The composition of Claim 1 in the form of a film.

20. An electron field emitting film comprising the composition of Claim 1.

21. A field emission triode comprising the film of Claim 20.

22. A field emission display comprising the film of Claim 20.

23. A lighting device comprising the film of Claim 20.

24. A vacuum electronic device comprising the film of Claim 20.

25. A process for creating images on a substrate comprising:

(a) depositing the composition of Claim 1 as a film on a substrate;

(b) exposing the film imagewise to radiation to form exposed and unexposed portions thereof; and

(c) removing the exposed portions to form a developed image.

26. The process of Claim 25 further comprising heating the developed image to form a first patterned structure.

27. The process of Claim 26 wherein forming a patterned structure comprises forming an insulator.

28. The process of Claim 26 wherein forming a patterned structure comprises forming a conductor.

29. The process of Claim 26 wherein forming a patterned structure comprises forming a semi-conductor.

30. The process of Claim 25 wherein the deposited film is a thick film.

31. A process according to Claim 26 further comprising depositing a composition of Claim 1, as a second film, onto the first patterned structure.

32. The process of Claim 31 further comprising:

(a) exposing the second film imagewise to radiation to form exposed and unexposed portions thereof; and

(b) removing the exposed portions to form a second developed image; and

(c) heating the second developed image to form a second patterned structure;

wherein the first and second patterned structures have the same size and shape.

33. A process for creating a multi-layer patterned structure comprising:

(a) depositing a first composition of Claim 1 as a first film on a substrate;

(b) depositing a second composition of Claim 1, as a second film, onto the first film;

(c) exposing the first and second films imagewise to radiation to form exposed and unexposed portions;

(d) removing the exposed portions to form a developed image.

34. The process of Claim 33 further comprising heating the developed image to form a patterned structure.

35. The process of Claim 34 wherein forming a patterned structure comprises forming an insulator.

36. The process of Claim 34 wherein forming a patterned structure comprises forming a conductor.

37. The process of Claim 34 wherein forming a patterned structure comprises forming a semi-conductor.

38. The process of Claim 33 wherein the deposited film is a thick film.

39. A process according to Claim 34 further comprising depositing a third composition of Claim 1, as a third film, onto the patterned structure.

40. A process according to Claim 25 or 33 wherein the deposition comprises screen printing, spin coating, ink jet printing, contact printing or stenciling.